Montana Content Standards Integration Chart for Mathematics

Mathematics

Standards	Grade 4	Grade 8	Upon Graduation
Standard 1-Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and using appropriate technology.	1. Solve problems from many contexts using a variety of strategies (e.g., estimate, make a table, look for a pattern, and simplify the problem). Explain the methods for solving these problems. [TE - 2.4.1; 5.4.1]. LM - 1.4.1; 2.4.2. [WR - 6.4.1; 6.4.3]. WP - 5.4.1. 2. Apply estimations strategies throughout the problem-solving process. WP - 5.4.1. 3. Communicate mathematical ideas in a variety of ways (e.g., written, verbal, concrete, pictorial, graphical, algebraic). SL - 2.4.3; 3.4.1;[3.4.2]. WR - 1.4.1; 1.4.2; 1.4.3; 1.4.4; 2.4.1; 2.4.2; 2.4.3; 2.4.4; [6.4.1; 6.4.3]. 4. Recognize and investigate the relevance and usefulness of mathematics through applications, both in and out of school. RE - 1.4.2 5. Select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, and computer. TE - 2.4.3; 3.4.1. LM - 4.4.1. WP - 5.4.1; 5.4.3.	1. Formulate and solve multi-step and nonroutine problems using a variety of strategies. Generalize methods to new problem situations. LM - 1.8.1. [WR - 6.8.1; 6.8.3]. 2. Select and apply appropriate estimation strategies throughout the problem-solving process. 3. Interpret and communicate mathematical ideas and logical arguments using correct mathematical terms and notations. RE - 2.8.6; 4.8.3. [SL - 3.8.1; 3.8.2]. WR - 1.8.1; 1.8.2; 1.8.3; 1.8.4; 2.8.1; 2.8.2; 2.8.3; 2.8.4; [6.8.1; 6.8.3]. 4. Recognize and investigate the relevance and usefulness of mathematics through applications, both in and out of school. RE - 1.8.2. 5. Select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices. TE - 2.8.2; 2.8.3; [5.8.1]. LM - 4.8.1.	1. Recognize and formulate problems from situations within and outside mathematics and apply solution strategies to those problems. TE - 2.12.1. HE - 5.12.1; 5.12.2. LM - 1.12.1. SC - 1.12.1. [WR - 6.12.1; 6.12.3]. 2. Select, apply, and evaluate appropriate estimation strategies throughout the problem-solving process. 3. Formulate definitions, make and justify inferences, express generalizations, and communicate mathematical ideas and relationships. LM - 1.12.3. RE - 1.12.1; 2.12.6. SL - 2.12.3; [3.12.1; 3.12.2]. WP - 3.12.1. WR - 1.12.1; 1.12.2; 1.12.3; 1.12.4; 2.12.1; 2.12.2; 2.12.3; 2.12.4; [6.12.1; 6.12.3]. 4. Apply and translate among different representations of the same problem situation or of the same mathematical concept. Model connections between problem situations that arise in disciplines other than mathematics. RE - 1.12.2. 5. Select and use appropriate technology to enhance mathematical understanding. Appropriate technology may include, but is not limited to, paper and pencil, calculator, computer, and data collection devices. TE - 2.12.3; [5.12.1]. LM - 2.12.4; 4.12.1. SC - 1.12.2.
Standard 2-Students demonstrate understanding of and an ability to use numbers and operations.	1. Exhibit connections between the concrete and symbolic representation of a problem or concept. 2. Use the number system by counting, grouping and applying place value concepts. [WP - 1.4.2]. 3. Model, explain, and use basic facts, the operations of addition and subtraction of whole numbers, and mental mathematics. 4. Model and explain multiplication and division of whole numbers. 5. Model and explain part/whole relationships in everyday situations.	1. Use the four basic operations with whole numbers, fractions, decimals, and integers. [WP - 1.8.2]. 2. Use mental mathematics and number sense in using order of operations, and order relations for whole numbers, fractions, decimals, and integers. 3. Use the relationships and applications of ratio, proportion, percent, and scientific notation. 4. Develop and apply number theory concepts (e.g., primes, factors and multiples) in real-world and mathematical problem situations.	1. Use and understand the real number system, its operations, notations, and the various subsystems. [WP - 1.12.2]. 2. Use definitions and basic operations of the complex number system. [WP - 1.12.2].
Standard 3-Students use algebraic concepts, processes, and language to model and solve a variety of real-world and mathematical problems.	1. Use symbols (e.g., boxes or letters) to represent numbers in simple situations. 2. Explore the use of variables and open sentences to express relationships (e.g., missing addend). 3. Use inverse operations and other strategies to solve number sentences.	1. Understand the concepts of variable, expression and equation. 2. Represent situations and number patterns using tables, graphs, verbal rules, equations, and models. ML - 2.8.1; 3.8.1. 3. Recognize and use the general properties of operations (e.g., the distributive property). 4. Solve linear equations using concrete, numerical and algebraic methods. 5. Investigate inequalities and nonlinear relationships informally.	1. Use algebra to represent patterns of change. 2. Use basic operations with algebraic expressions. 3. Solve algebraic equations and inequalities: linear, quadratic, exponential, logarithmic, and power. 4. Solve systems of algebraic equations and inequalities, including use of matrices. 5. Use algebraic models to solve mathematical and real-world problems.
Standard 4-Students demonstrate understanding of shape and an ability to use geometry.	1. Describe, model, and classify two- and three-dimensional shapes. AR - 2.4.1 (VA). 2. Investigate and predict results of combining, subdividing, and changing shapes. 3. Identify lines of symmetry, congruent and similar shapes, and positional relationships. HE - 2.4.1.	1. Identify, describe, construct, and compare plane and solid geometric figures. AR - 2.8.1 (VA). 2. Understand and apply geometric properties and relationships (e.g., the Pythagorean Theorem). 3. Represent geometric figures on a coordinate grid. ML - 3.8.1. 4. Explore properties and transformations of geometric figures. 5. Use geometry as a means of describing the physical world.	1. Construct, interpret, and draw three-dimensional objects. AR - 2.12.1 (VA). 2. Classify figures in terms of congruence and similarity and apply these relationships. 3. Translate between synthetic and coordinate representations. 4. Deduce properties of figures using transformations, coordinates, and vectors in problem solving. 5. Apply trigonometric ratios (sine, cosine and tangent) to problem situations involving triangles.
Standard 5-Students demonstrate understanding of measurable attributes and an ability to use measurement processes.	1. Estimate, measure and investigate length, capacity, weight, mass, area, volume, time, and temperature. 2. Develop the process of measuring and concepts related to units of measurement, including standard units (English and metric) and nonstandard units. SC - 1.4.2. SS - 3.4.1. 3. Apply measurement skills to everyday situations. SC - 1.4.2. 4. Select and use appropriate tools and techniques. [TE - 2.4.3].	1. Estimate, make, and use measurements to describe, compare, and/or contrast object in real-world situations. SS - 3.8.5. 2. Select and use appropriate units and tools to measure to a level of accuracy required in a particular setting. SC - 1.8.2. 3. Apply the concepts of perimeter, area, volume and capacity, weight and mass, angle measure, time, and temperature. 4. Demonstrate understanding of the structure and use of systems of measurement, including English and metric. SC - 1.8.2. 5. Use the concepts of rates and other derived and indirect measurements. 6. Demonstrate relationships between formulas and procedures for determining area and volume.	1. Apply concepts of indirect measurements (e.g., using similar triangles to calculate a distance). 2. Use dimensional analysis to check reasonableness of procedures. 3. Investigate systems of derived measures (e.g., km/sec, g/cm3). 4. Apply the appropriate concepts of estimates in measurement, error in measurement, tolerance, and precision. SC - 1.12.2.
Standard 6-The students demonstrate understanding of and an ability to use data analysis, probability, and statistics.	1. Collect, organize, and display data. [TE - 2.4.1]. HE - 4.4.4. ML - 1.4.1. SC - 1.4.2. 2. Construct, read, and interpret displays of data, including graphs. [TE - 2.4.1]. HE - 4.4.4. ML - 1.4.1. RE - 2.4.4; 4.4.3. SS - 3.4.5. 3. Formulate and solve problems that involve collecting and analyzing data. SC - 1.4.1. WP - 5.4.2; 5.4.3. 4. Demonstrate basic concepts of chance (e.g., equally likely events, simple probabilities).	1. Systematically collect, organize, and describe data. [TE - 2.8.1; 2.8.2]. HE - 4.8.4. ML - 1.8.1. SC - 1.8.1. WR - 1.8.1; 2.8.1. 2. Construct, read, and interpret tables, charts, and graphs. [TE - 2.8.1; 2.8.2]. HE - 1.8.1; 1.8.5; 4.8.4; 5.8.3. ML - 3.8.1. RE - 2.8.4; 4.8.3. 3. Draw inferences, construct, and evaluate arguments based on data analysis and measures of central tendency. HE - 4.8.4. RE - 1.8.1; 1.8.2; 4.8.7. SC - 1.8.1. 4. Construct sample spaces and determine the theoretical and experimental probabilities of events. 5. Make predictions based on experimental results or probabilities. SC - 1.8.1.	1. Use curve fitting to make predictions from data. 2. Apply measures of central tendency and demonstrate understanding of the concepts of variability and correlation. 3. Select an appropriate sampling method for a given statistical analysis. SS - 3.12.5. [WP - 3.12.4]. 4. Use experimental probability, theoretical probability, and simulation methods to represent and solve problems, including expected values. 5. Design a statistical experiment to study a problem and communicate the outcomes. TE - 2.12.2. 6. Describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.
Standard 7-Students demonstrate understanding of and an ability to use patterns, relations and functions.	1. Recognize, describe, extend, and create a variety of patterns. RE - 2.4.4. SC - 1.4.4. 2. Represent and describe mathematical and real-world relationships. ML - 3.4.1.	1. Describe, extend, analyze, and create a variety of patterns and functions. 2. Describe and represent relationships with tables, graphs, and rules. 3. Analyze functional relationships to explain how a change in one quantity results in a change in another. 4. Use patterns and functions to represent and solve problems. RE - 2.8.4. 5. Describe functions using graphical, numerical, physical, algebraic, and verbal models or representations.	1. Describefunctions and their inverses using grahical, mumerical, physical, algebraic, and verbal mathematical models or representations. 2. Analyze the graphs of the families of polynomial, rational, power, exponential, logarithmic, and periodic functions. 3. Analyze the effect of parameter changes on the graphs of functions and relations, including translations. 4. Model real-world phenomena with a variety of functions. 5. use graphing for parametric equations, three-dimensional equations, and recursive relations.

LEGEND: **This chart illustrates the "explicit" and "implicit" overlaps in the standards. With "explicit" overlaps, a teacher will naturally cover both standards. With "implicit" (in brackets ex: [RE - 1.4.2]) a teacher could easily teach both standards with minor adjustments.**

Content Code:
AR - Arts (dark pink) · HE - Health Enhancement (black) · LM - Library Media (pink) · LT - Literature (blue) · MA - Math (green)
ML - Media Literacy (blue) · RE - Reading (blue) · SC - Science (red) · SS - Social Studies (gold) · SL - Speaking and Listening (blue)
TE - Technology (purple) · WP - Workplace Competencies (yellow) · WL - World Languages (lilac) · WR - Writing (blue)

User Code: MA 1.4.2 = Mathematics, Standard 1, Grade 4, Benchmark 2

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